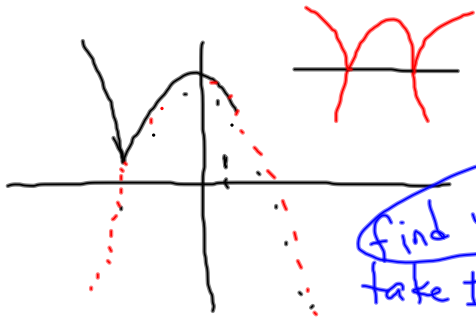


13) $f(x) = 1 + |9 - x^2|; [-5, 1]$

13



$$f(x) = \begin{cases} 1 + (9 - x^2), & x \in [-3, 1] \\ 1 - (9 - x^2), & x \in [-5, -3] \end{cases}$$

find vertex
take the deriv

$$f'(x) = \begin{cases} -2x & ; (-3, 1) \\ 2x & ; (-5, -3) \end{cases}$$

$$\begin{aligned} 9 - x^2 &= 0 \\ 9 &= x^2 \\ \pm 3 &= x \end{aligned}$$

find critical pts.

(a) $-2x = 0$
 $\Rightarrow x = 0$ ✓

(c) is f' undefined?

$x = -3$ ✓

(b) $2x = 0$
 $\Rightarrow x = 0$ ✗

critical pts: $x = 0, -3$

end pts: $x = -5, 1$

x	$f(x) = 1 + 9 - x^2 $	ABS
-5	$1 + 9 - 25 = 17$	MAX
-3	1	ABS MIN
0	10	
1	9	

5.5 homework

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14] $f(x) = |6 - 4x|; [-3, 3]$

$$f(x) = \begin{cases} 6 - 4x, & x \in [-3, \frac{3}{2}] \\ -(6 - 4x), & x \in (\frac{3}{2}, 3] \end{cases}$$

$$6 - 4x \geq 0$$

$$6 \geq 4x$$

$$\frac{3}{2} \geq x$$

$$f'(x) = \begin{cases} -4, & x \in (-3, \frac{3}{2}) \\ +4, & x \in (\frac{3}{2}, 3) \end{cases}$$

Look for rel. extrema

Find crit pts

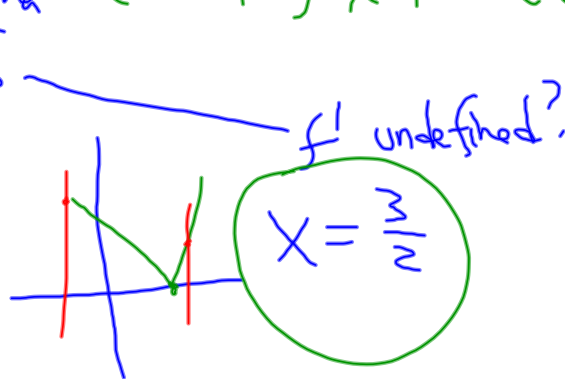
$$f' = 0$$

a) $-4 \stackrel{?}{=} 0$

\Rightarrow no x ,

b) $+4 \stackrel{?}{=} 0$

\Rightarrow no x ,



critical pts: $x = \frac{3}{2}$

end pts: $x = -3, +3$

x	$f(x) = 6 - 4x $	
-3	18	ABS MAX
$\frac{3}{2}$	0	ABS MIN
3	6	

$$y = \tan u$$

$$u = v - \frac{1}{v}$$

$$v = \ln x$$

$$\tan\left(\ln x - \frac{1}{\ln x}\right) \quad x=e$$

$$\text{find } \frac{dy}{dx} @ x=e$$

$$\tan\left(\ln e - \frac{1}{\ln e}\right)$$

$$\tan\left(\ln x - \frac{1}{\ln x}\right) \quad (\ln x)^{-1}$$

$$\tan\left(1 - \frac{1}{1}\right) = \tan(0)$$

$$y' = \sec^2\left(\ln x - \frac{1}{\ln x}\right) \frac{d}{dx}\left(\ln x - \frac{1}{\ln x}\right)$$

$$\sec^2(0) = \frac{dy}{dx}$$

$$= \sec^2\left(\ln x - \frac{1}{\ln x}\right) \left(\frac{1}{x} + (\ln x)^{-2} \frac{d}{dx}(\ln x)\right)$$

$$\frac{1}{\cos^2(0)} = \frac{1}{1} = 1 = C$$

$$= \sec^2\left(\ln x - \frac{1}{\ln x}\right) \left(\frac{1}{x} + \frac{1}{x(\ln x)^2}\right) \Big|_{x=e}$$

$$= (1) \left(\frac{1}{e} + \frac{1}{e}\right) = \left(\frac{2}{e}\right)$$

5.5 homework

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